

# Preliminary Revision of the Genus *Systella* Westw.

(Orth. Pyrgom.)

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(Láms. III-V.)

The genus *Systella* was established by Westwood in 1841, with two species, i. e. *rafflesii* and *hopei*. Bolivar placed in 1884 the latter species into the subgenus *Trigonopteryx* Charp., together with its genotypical species *punctata*.

In 1905 he raised the subgenus *Trigonopteryx* to the rang of genus, with its two species, *punctata* and *hopei*.

A second species belonging to the genus *Systella* was described by de Haan in 1842 under the name *Acridium (Trigonopteryx) platypterum*.

Still other species were described by Walker in 1870, under the name *Trigonopteryx philippensis* and *Tr. obliqua*.

It was Kirby in his Catalogue of 1910, who placed them rightly into the genus *Systella*.

In 1877 Stål described a new species, *Systella westwoodii*.

In his monographic revision of the Pyrgomorphidae, Bolivar described in 1884, under the subgeneric name *Systella*, the already mentioned *rafflesii*, *platypterum* and *westwoodii*.

In 1905 Bolivar described 4 new species, *siccifolia*, *annandalei*, *gestroi* and *dusmeti*, giving a total of 6 species belonging to the genus *Systella*, also mentioning them in the Genera Insectorum.

Kirby in his Catalogue of 1910 mentions 10 species.

The last reference as to a new species was given by me in 1928 about a species occurring in the Mentawai Islands, however without description. In this revision I am treating 11 species shere among 4 new species are described.

I had the opportunity to study in total 88 specimens and states that more than a preliminary revision is impossible.

It seems that in some cases there are great morphological differences between the male and female and in the studied material I could not state, with absolute security, the solidarity of male and female specimens from the same locality. In only 4 cases I feel sure in considering the male and female specimen as belonging to the same species. In all other cases I described males and females each under a proper name and only more material, being collected with more care as to that point, can dissolve this difficulty.

When studying the types, cotypes and all the other material I could state that the differences given by Bolívar in his key, are not always constant and some of them without any value. The form of the fastigium of vertex, the venation of elytra and wing even in the same specimen are variable, whereas the external genitalia offer no differences.

The exceedingly uniform general habitus makes their study rather difficult.

The characters as used by me in the keys are the best I could find, but where the shape of antennae and elytra are also somewhat variable and very difficult to describe because of the often little differences between the species, I recommend to compare always with the figures when using the keys. Through the kindness of Mr. I. Bolívar (Madrid), Sjöstedt (Stockholm) and E. Titschack (Hamburg) I could study the types of nearly all species, while Mr. B. P. Uvarov (London) had the kindness to compare some specimens with the types of Walker and I myself, when visiting London, could also make some comparisons with the type of Westwood. I wish here to express my sincere thanks to the above mentioned persons and to the authorities of the different museums for the ready support given to my work.

The material that I studied, provides from the respective Museums of Natural History of Berlin, Genua, Hamburg, Leiden, London, Madrid, Singapore and Stockholm.

Gen. **Systella** Westw.

1841. *Systella* Westwood, J. O., *Arcana Entomol.*, vol. 1, p. 12, pl. IV.  
 1870. *Trigonopteryx* (partim) Walker, Fr., *Cat. Derm. Salt. B. M.*, III,  
     p. 518, No. 2; p. 519, No. 5.  
 1875. *Gyrtone* Stål, C., *Bihang Svensk. Akad. Handl.*, III (14) p. 25.  
 1884. *Systella* Bolivar, I., *Ann. Soc. Esp. Hist. Nat.*, XIII, pp. 22, 51, 52, 494.  
 1905. *Systella* Bolivar, I., *Bol. Soc. Esp. Hist. Nat.*, v, p. 303.  
 1909. *Systella* Bolivar, I., *Gen. Ins. Orth. Acrid. Pyrgom.*, pp. 51-53.  
 1910. *Systella* Kirby, *Syn. Cat. Orth.*, III, p. 339.  
 1930. *Systella* Willemse, *Tijds. voor Entom. Dl.*, LXXIII, p. 92.

Size medium, body strongly compressed laterally, slender rugosely punctured. Antennae relatively short, not surpassing the posterior margin of the pronotum; the basal joint broader than long, second joint much smaller and rounded, the rest of the antenna consisting of a basal and apical half. In the male with the basal half triquetral and little or not expanded outwardly, the apical half more filiform with the joints finely punctured and hirsute, more or less velvety. In the female with the basal half triquetral and mostly, more or less strongly expanded outwardly, the apical half more filiform with the joints finely punctured and hirsute, more or less velvety.

Apical joint in both sexes pointed. Antennae inserted near the apex of the fastigium of vertex. Head conical, ascending. Face strongly reclinate, in profile slightly concave; frontal ridge only indicated between the antennae, strongly compressed and sulcate, a little widened just above the antennae in the female, in the male more compressed; a little below the antennae obliterated. Face coarsely punctured. Median ocel subobliterated, lateral ocelli placed just above the eye. Lateral facial keels indistinct. Fastigium of vertex in profile ascending, projecting considerably beyond the eyes; the margins parallel or subparallel, near the apex rounded or suddenly narrowed, the extreme apex rounded or triangular; its surface rugosely punctured, with a V shaped impression, sometimes with an indication of a median sulcus in front.

Eyes oval, broadly separated on the vertex; moderately prominent sideways. Vertex subconvex, rugosely punctured. Pronotum stron-

gly compressed laterally; anterior margin straight or nearly so, posterior margin rounded; median keel absent or subobsolete, lateral keels well developed, indicated by rugosely punctured lines, subparallel, in the prozona slightly curved inward; first and second transverse sulcus indistinct, third sulcus distinct though fine, nearly in the middle of pronotum. The whole surface of the pronotum rugosely punctured. Lateral lobes of pronotum vertical, much higher than long, anterior- and lower margin straight, strongly widened poste-

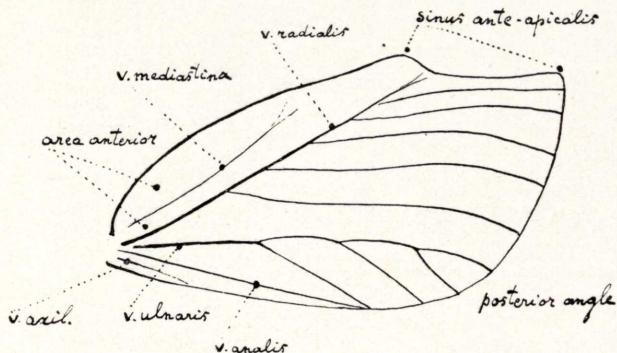


Fig. 1.—*Systella platypterus* de Haan, ♂. Elytra.

riorly, posterior margin concave; anterior angle obtusely angulated, posterior angle acute, less than  $90^{\circ}$ ; its surface rugosely punctured with 3 fine sulci corresponding with the sulci of the dorsum of pronotum.

Elytra and wings well developed, reaching beyond the apex of hind femora, carried vertical when in rest.

Elytra (fig. 1) very broad, leaflike, with dense reticulation, its general shape triangular; anterior margin with a more or less deep excavation near the apex (sinus ante apicalis), apical margin slightly concave, with a broad rounded angle or arch passing into the posterior margin. Mediastinal vein distinct, mediastinal- and scapular area relatively broad; radial veins melted together, with 5-6 parallel branches going to the apical margin; ulnar veins melted together with some branches to the posterior margin, anal vein strong, slightly curved, axilar vein distinct or subobliterated, area analis very small.

Wings (fig. 2) very broad, costal area broad, apex angulately rounded, posterior margin with a triangular incision near the ulnar vein, area analis about as broad as the pre-anal areas together. Wings hyalinous or with some whitish dots, never with blackish spots.

Anterior margin of prosternum with an acute tubercle in its middle. In the middle of the prosternum with a low median sulcus. Anterior margin of mesosternum angulately bent forwards; mesosternal lobes about as long as broad, their inner margin rounded, their interspace narrow, widened posteriorly; metasternal foveolae contiguous. Anterior and median legs short; anterior femora more or less granulose with irregular keels from above, near the apex with an inner- and outer lobe, median femora less granulose, with regular

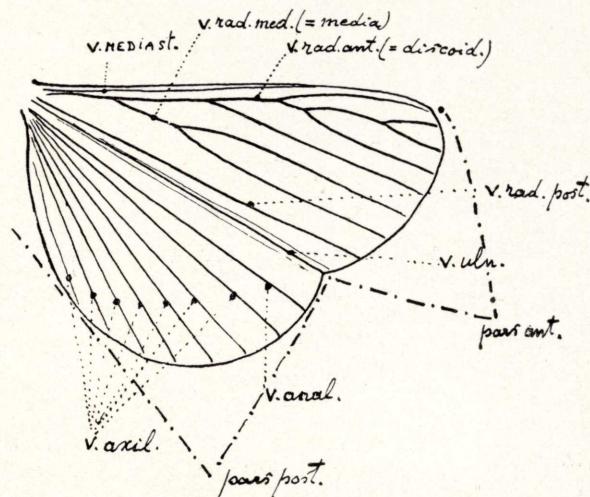


Fig. 2.—*Systella* sp. Wing.

keels; anterior tibia shorter than the femora, with a row of strong spines on either side in the apical half, tarsi about as long as the tibia; median tibia a little shorter than the femora, with a row of spines on either side in the apical half, tarsi a little shorter than the tibia. Hind femora strongly compressed laterally, reaching as far as or a little beyond the apex of abdomen; areae supero-externa and interna very small, areae infero-externa and interna much larger, area externo-media flat, with pinnated reticulation; upper and lower carina acutely, though finely, dentate, the other keels subdenteate; genicular lobes rounded.

Hind tibiae straight, not expanded apically, on both sides shallowly sulcated, with 8-9 inner- and 8-10 outer spines, with outer apical spine.

Hind tarsi short, not reaching beyond the middle of hind-tibia, third joint longer than the two others together.

Abdomen compressed laterally, carinated from above and from beneath.

♂. Supra-anal plate long, narrow lanceolate, apex triangularly rounded, with a median impression in the basal half, the sides being slightly incurved in the middle.

Cercus short, not reaching beyond the supra-anal plate, turned upwards, seen in profile dilated basally, conical, the apical half more cylindrical and narrower than the basal one, slightly curved, the apex more or less pointed.

Subgenital plate compressed laterally, stout, the posterior margin nearly straight, upper margin straight and descending anteriorly, forming with the posterior margin an acute angle.

♀. Supra-anal plate narrow, triangular, apex rounded, in profile curved upwards; with a median basal sulcus. Cercus as in the male.

Valves of ovipositor elongate, upper valves with the margins smooth or subdentate, the apex blunt; lower valves slightly curved upwards, with some irregular teeth near the apex.

Subgenital plate strongly compressed laterally, a little longer than high, with a deep slitlike incision from the apex to the base.

Genotype: *Systella rafflesii* Westwood.

The larva differs from the adult, besides the normal differences, in having the pronotum tectiform with strong median keel, without any lateral carinae and the above carinated and dentated abdomen.

Stål described the larva as *Gyrtone* with the species *G. compressa* (pl. III, fig. 1) from Malaca and Walker as *Opomala serrata* being also a larva of *Systella*, from an unknown locality. The further biology is unknown.

#### Key to the species.

♂.

1. Sinus ante-apicalis of the elytra as long as a fifth of the length of elytra...  
..... **philippensis** Walker.
2. Sinus ante-apicalis of the elytra longer, as long as a fourth or third part of  
the length of elytra..... 2
2. Anterior area of elytra only slightly narrowed apically.. **dusmeti** Bolivar.  
Anterior area of elytra from the middle of anterior margin, distinctly nar-  
rowed apically..... 3

3. Elytra relatively narrow, the proportion of width to length being 6 : 14.  
 Antennae slender. Apex of elytra rounded, not pointed..... 4  
 Elytra distinctly broader, the proportion of width to length being 7 : 14.  
 Antennae slender or more thick..... 5
4. Elytra relatively long, anterior area in the middle less broad than in *boli-vari*. Pars anterior of wings only slightly less broad than pars posterior..... *gestroi* Bolivar.  
 Elytra less long, anterior area in the middle broader. Pars anterior of wings distinctly less broad than pars posterior..... *bolivari* nov. sp.
5. Elytra relatively broad. Sinus ante-apicalis more than a third of the length of the elytra; only slightly narrowed apically..... *obliqua* Walker.  
 Elytra relatively less broad. Sinus ante-apicalis a third or a fourth of the length of the elytra..... 6
6. Pronotum relatively broad and short. Sinus ante-apicalis a third of the length of the elytra; elytra relatively broad.. *platypteron* De Haan.  
 Pronotum longer and narrower. Sinus ante-apicalis a fourth of the length of the elytra; elytra relatively more narrow... *sarawakensis* nov. sp.

♀.

1. Sinus ante-apicalis of the elytra as long as a fifth of the length of elytra.  
 Antennae not or indistinctly dilated basally..... 2  
 Sinus ante-apicalis of the elytra as long as a fourth or third part of the length of elytra..... 3
2. Antennae short. Last joint of the basal half of antennae distinctly broader than long. Apex of elytra pointed. Pars anterior of the wing a little smaller than the pars posterior..... *sarawakensis* nov. sp.  
 Antennae longer. Last joint of the basal half of antennae distinctly longer than broad. Apex of elytra rounded. Pars anterior of the wing distinctly broader than the pars posterior.... *philippensis* Walker.
3. Antennae in the basal half distinctly dilated..... 4  
 Antennae in the basal half indistinctly dilated, gradually narrowed apically..... 5
4. Last joint of the basal half of antennae distinctly broader than long. Antennae short and strongly dilated basally..... *rafflesii* Westwood.  
 Last joint of the basal half of antennae nearly as long as broad. Antennae longer and less dilated basally..... *annandalei* Bolivar.
5. Elytra relatively narrow, the proportion of width to length being about 7 : 14. Antennae short..... 6  
 Elytra broader, the proportion of width to length being about 8 : 14. Antennae longer..... 7
6. Anterior area of elytra distinctly narrowed apically. Posterior angle of elytra angulately rounded. Sinus ante-apicalis less concave..... *gestroi* Bolivar.

\*

Anterior area of elytra slightly narrowed apically. Apex of elytra pointed. Posterior angle of elytra broadly rounded. Sinus ante-apicalis distinctly concave..... **dusmeti** Bolivar.

7. Pronotum broad. Sinus ante-apicalis concave. Posterior angle of elytra angulately rounded..... **borneensis** nov. sp.

Pronotum distinctly narrower. Sinus ante-apicalis less concave. Posterior angle of elytra broadly rounded..... **dubia** nov. sp.

**Systella philippensis** Walker (figs. 3 and 4; pl. III, figs. 2-4).

1870. *Trigonopteryx philippensis* Walker, *Cat. Derm. Salt. B. M.*, III, p. 518, No. 2.

1841. *Systella rafflesii* ♂ Westwood, *Arcana Entom.*, I, p. 12.

1877. *Systella westwoodii* Stål, *Oefv. Vet. Akad. Förh.*, XXXIV, (10), p. 52, No. 1.

1884. *Systella westwoodii* Bolivar, *An. Soc. Esp. Hist. Nat.*, XIII, pp. 52, 54, pl. I, fig. 3.

1905. *Systella westwoodii* Bolivar, *Bol. Soc. Esp. Hist. Nat.*, V, pp. 303, 304, No. 1.

1905. *Systella siccifolia* Bolivar, *Bol. Soc. Esp. Hist. Nat.*, V, pp. 303, 304, No. 2.

1909. *Systella westwoodii* Bolivar, *Genera Ins., Orth. Acrid. Pyrgom.*, p. 54, No. 1.

1909. *Systella siccifolia* Bolivar, l. c., p. 54, No. 2.

1910. *Systella westwoodii* Kirby, *Syn. Cat. Orth.*, III, p. 340, No. 2.

1910. *Systella siccifolia* Kirby, l. c., p. 340, No. 3.

1910. *Systella philippensis* Kirby, l. c., p. 340, No. 1.

1915. *Systella philippensis* Bruner, *Univ. Studies Lincoln*, XV, No. 2, p. 60.

1915. *Systella westwoodii* Bruner, l. c., p. 60.

1925. *Systella rafflesii* ♂ Uvarov, *Trans. Entom. Soc. London*, p. 284.

1925. *Systella philippensis* Uvarov, l. c., p. 284.

♂♀. General coloration brown or green or green and brown, sometimes more yellowish green.

Antennae in the male relatively long (fig. 3), reaching the base of elytra, slender, not or scarcely widened basally, brown, with black points, the apical half yellowish-brown or only the apical joints; in the female shorter, not reaching beyond the principal sulcus of pronotum, slightly widened basally, gradually narrowing apically, last joint of the basal half distinctly longer than broad, brown with black points, the apical half blackish brown, without black points, except

the apical joint that is more yellowish-brown. Head and pronotum brown or greenish brown with black points, especially along the keels. Fastigium of vertex narrowed in front, with the sides straight or slightly concave, the very apex acute, more or less pointed.

Elytra broad (fig. 4), area anterior in the male distinctly narrowed from the middle to the apex, in the female less narrowed, sinus ante-apicalis as long as the fifth of the length of elytra, posterior angle broadly rounded; its coloration is greenish or yellowish green or greenish brown with dark fine points along the veins, and some irregular dark brown or black spots in the area anterior and in the areas between the secondary veins; sometimes with a faint indication of a brownish oblique stripe in the middle, beginning in the middle of the area anterior and reaching the middle of elytra.

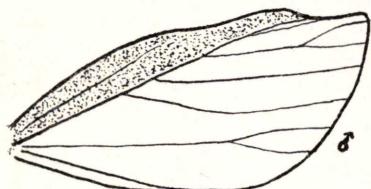


Fig. 4.—*S. philippensis* Walk. ♂ type. Elytra.

wish with the veins yellowish brown.

Anterior- and median legs and abdomen brown with black points.

Hind femora brown or greenish brown with black points along the keels and on the area externo-media.

Hind tibiae brown, spines with black tips.

Hind tarsi brown.

	♂	♀
Length of body.....	26-30 mm.	34-38 mm.
— of antennae.....	10-11 —	9-10 —
— of pronotum.....	7-8 —	10-11 —
— of elytra .....	21-24 —	29-31 —
Width of elytra.....	10-11,5 —	15-16 —
Length of hind femora .....	13-15 —	17-18 —

Locality: Philippines, ♂ type (Mus. London); Philippines, Surigao, Mindanao, ♂ ♀ (Mus. Stockholm); Philippines (Mus. Berlin); Philippines, Tagabas, Samar (Mus. Madrid); Albay, S. Luzon, Surigao, Mindanao (coll. mea).



Fig. 3.—*Systella philippensis* Walk. Antenna ♂; *l*, last joint of basal part.

**Systella dusmeti** Bolivar (fig. 5; pl. III, fig. 5; pl. IV, fig. 7).

1905. *Systella dusmeti* Bolivar, *Bol. Soc. Esp. Hist. Nat.*, v, pp. 303, 306.  
 1909. *Systella dusmeti* Bolivar, *Genera Ins., Orth. Acrid. Pyrgom.*, p. 54,  
 Pl. figs. 11, 11 a, 11 b.  
 1910. *Systella dusmeti* Kirby, *Syn. Cat. Orth.*, III, p. 340, No. 10.

♂♀. General coloration brown or yellowish brown or greenish. Antennae short, reaching a little beyond (♂) or not reaching the middle of pronotum; in the basal half scarcely or only slightly dilated, gradually narrowed apically; basal half in the male not reaching beyond a third of the length of antenna, its last joint longer than broad, in the female reaching the middle of antenna, its last joint distinctly broader than long; brown with or without dark spots, darker apically (apical joint yellowish brown?). Head brown or yellowish brown, front often dark or with a dark stripe along the lateral facial keels.

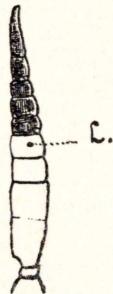


Fig. 5.-*S. dusmeti* Bol. Antenna ♀ type; L, last joint of basal part.

Fastigium of vertex rounded or rounded triangular.

Pronotum brown or yellowish brown, often blackish brown from above.

Elytra reaching far beyond the apex of hind femora, broad, area anterior broad, especially in the female, only slightly narrowed apically, sinus ante-apicalis in the male about as long as a third, in the female as a fourth of the length of elytra, distinctly concave, apex more or less pointed, posterior angle broadly rounded; its coloration brown or yellowish-green with dark points along the veins and dispersed dark spots, in the male with a dark brown oblique stripe in the middle of elytra, beginning near the middle of the anterior margin and not reaching the posterior angle, in the female with a great round, blackish spot in the middle of the anterior area with indication of a brown oblique stripe.

Wings hyalinous, veins yellowish, apical margin often bordered with brown; with some pale whitish dots in the middle of the wing.

Anterior and median legs brown, tibiae with yellowish spots.

Hind femora brown or yellowish brown with dark spots, hind ti-

biae yellowish brown, darker apically, with a black spot in the basal third from above, spines yellowish brown with dark tips.

Hind tarsi brown with black.

Sternum and abdomen brown with dark points.

	♂	♀
Length of body.....	29 mm.	37 mm.
— of antennae .....	9 —	8 —
— of pronotum.....	7,5 —	10 —
— of elytra.....	25 —	30 —
Width of elytra .....	12,5 —	17 —
Length of hind femora .....	13 —	16,5 —

Locality: Borneo, Kina Balu, type (Mus. Madrid); Kina Balu, 1.500 m., Waterstradt leg, Nord Borneo, H. Fruhstorfer, Nord Borneo A. J. Speyer (coll. Mus. Hamburg).

**Systella gestroi** Bolivar (fig. 6; pl. IV, figs. 6-7).

- 1905. *Systella gestroi* Bolivar, *Bol. Soc. Esp. Hist. Nat.*, v, pp. 303, 306,  
No. 5.
- 1909. *Systella gestroi* Bolivar, *Gen. Ins., Orth. Acrid. Pyrgom.*, p. 54,  
No. 5.
- 1910. *Systella gestroi* Kirby, *Syn. Cat. Orth.*, III, p. 340, No. 9.
- 1915. *Systella gestroi* Bruner, *Univ. Stud. Lincoln*, xv, p. 60.

♂ ♀. General coloration brown or greenish brown.

Antennae in the male reaching beyond the middle of pronotum, slender, not or scarcely widened basally, the basal part forming a third part of the antenna, the last joint of it considerably longer than broad; in the female short (fig. 6), not reaching the middle of pronotum, slightly dilated basally, the basal part about as long as the apical one, the last joint of it as long as broad or a little broader. Its coloration brown with dark points, the apical half blackish brown, in the male yellowish brown.

Head and pronotum brown, front and disc of pronotum sometimes blackish brown. Fastigium of vertex in the male with the apex pointed; the sides straight or concave, in the female with the apex acutely pointed.

Elytra in the male relatively narrow, reaching far beyond the apex

of hind femora, anterior area distinctly narrowed apically, sinus ante-apicalis as long as a third of the length of elytra, shallowly excised, not concave, apex acute angularly rounded; its coloration greenish-yellow with dispersed brown spots and a small oblique dark stripe extending from the middle of anterior margin to nearly the middle of elytra.

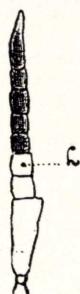


Fig.6.—*S. gestroi* Bol. Antenna ♀ type; *L*, last joint of basal part.

In the female broad, reaching far beyond the apex of hind femora, anterior area slightly narrowed apically, sinus ante-apicalis somewhat longer as a third of the length of elytra, concave, apex pointed, posterior angle broadly rounded; its coloration brown, with irregular darker or brighter spots throughout and with a round dark or more yellowish spot, sometimes bordered with brown, in the middle of the anterior area; sometimes with an indication of an oblique brownish stripe running from this spot to the middle of elytra.

Wings hyaline with yellowish-brown veins and some whitish dots.

Anterior and median legs brown, with some black spots or points.

Hind femora brown with or without dark spots.

Hind tibiae brown with a black spot from above in the basal third, sometimes on each side with a yellowish stripe. Hind tarsi yellowish brown, third joint with the apical half black or brown. Sternum and abdomen brown.

	♂	♀
Length of body.....	28 mm.	36-37 mm.
— of antennae.....	9 —	8-8,5 —
— of pronotum .....	8 —	10-11 —
— of elytra.....	29 —	32-35 —
Width of elytra .....	8 —	16-18 —
Length of hind femora.....	15 —	18-19 —

Locality: Engano, Malaconni, VI.1891, ♀; Engano, Bua-Bua, VI.1891, ♂; Modigliani (types Mus. Madrid); Sumatra, 3 ♀♀ (Mus. Berlin).

**Systella obliqua** Walker (figs. 7-10; pl. III, fig. 6).

1870. *Trigonopteryx obliqua* Walker, *Cat. Derm. Salt. B. M.*, III, p. 519, No. 5.  
 1884. *Systella platyptera* Bolivar (nec De Haan), *An. Soc. Esp. Hist. Nat.*, XIII, p. 54.  
 1905. *Systella annandalei* ♂ Bolivar, *Bol. Soc. Esp. Hist. Nat.*, V, pp. 303, 305, No. 4.  
 1910. *Systella obliqua* Kirby, *Syn. Cat. Orth.*, III, p. 340, No. 6.  
 1925. *Systella rafflesii* Uvarov, *Trans. Entom. Soc. London*, p. 283 (partim).  
 1930. *Systella obliqua* Willemse, *Tijdschr. Entom. Deel.*, LXXIII, p. 96, fig. 78.

♂. General coloration brown or green.

Antennae slender, nearly reaching the posterior margin of pronotum, scarcely widened basally, the last joint of the basal part considerably longer than broad; its coloration brownish, greenish-brown, apical joint mostly blackish-brown or darker coloured than the other joints. Head and pronotum brown, reddish-brown or greenish-brown, sometimes a dark stripe on each side of the front or head and pronotum from above greenish-brown or blackish brown.

Elytra reaching far beyond the apex of hind femora, relatively broad, anterior area slightly narrowed apically, sinus ante-apicalis somewhat longer than the third of the length of elytra, distinctly concave, apex pointed, posterior angle broadly rounded; its coloration green or brown, with some irregular spots in the apical half and along the posterior margin, dark points along the veins, sometimes yellowish brown with greenish, with a brown oblique stripe, running from the middle of anterior margin to nearly the posterior angle, but not reaching it.

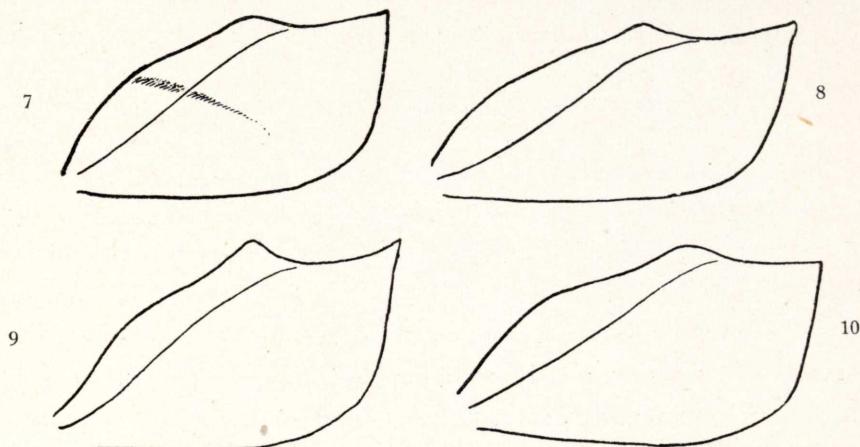
Between the studied specimens there is a little difference in the shape of elytra as shown in the figures 7-10. These differences are too little to be described, the general shape being in each case the same.

Wings hyaline or pale greenish, veins brown or green; with some whitish dots.

Anterior- and median legs brown or green with dark dots, tibiae with a yellowish dot in the middle.

Hind femora brown or greenish brown with dark spots or a dark

stripe in the middle of the area externo-media. Hind tibiae brown or greenish brown, with a dark spot from above in the basal third; the apical third brown of blackish brown; spines with black tips. Hind tarsi brown or greenish, the apical joint near the apex blackish brown.



Figs. 7-10: *Systella obliqua* Walk.—Fig. 7: ♂ type, Malacca. Elytra (after a drawing received from Mr. B. P. Uvarov).—Fig. 8: ♂, elytra, Specimen from Central Sumatra (Mus. de Berlin).—Fig. 9: ♂, elytra, Specimen from Perak (Mus. London).—Fig. 10: ♂, elytra, Specimen from Mt. Matang, Sarawak (Mus. Stockholm).

Sternum and abdomen brown or yellowish brown. ♀ unknown.

♂

Length of body .....	30-33 mm.
— of antennae.....	9-10 —
— of pronotum.....	8-9 —
— of elytra.....	27-33 —
Width of elytra .....	15-16 —
Length of hind femora .....	14-15 —

Locality: Malacca (type Mus. London); Malay Penins., Kedah Peak, 1.000 ft., 2.500-3.000 ft., 28-III-1928; Pahang, F. M. S., Rumpin Endau, July 1917 (this specimen was compared with type by B. P. Uvarov); Pahang, F. M. S., Frasern Hill, 4.000 ft., 30-VIII-1923, M. R. Henderson; Pahang, F. M. S., Kuala Jeku, 500 ft., in the jungle, 5-XII-1921, H. M. Pendlebury; Selangor, F. M. S., Ulu Combak, VII-1915; Selangor, F. M. S., Gintius Bidar, 2.000 ft., C. Boden Kloss; Siam, Nakou Sri-Tamarat, Khao Luang, 1.500-3.000 ft., III-1922, H. M. Pendlebury; Siam, Nakou Sri-Tamarat, Khao Ram, 1.200 ft., 26-II-1922, H. M. Pendlebury.

dlebury; Perak, Jor Camp, 2,000 ft., 27-VIII-1923, E. Seimund; Perak, Batang Padang, Jor Camp, 1,800 ft., 4-VI-1923, H. M. Pendlebury (coll. Mus. London); Central Sumatra, Sibuaya, 2-X-1907, Dr. Moszkowski; Deli, Ober-Langkat Deli-Sumatra, 1894 (coll. Mus. Berlin); Sumatra, I-1878, Sumatra-Exped. (coll. Mus. Leiden); Pontianak; Sumatra Liangagas (Dohrn); Matang Rd, 17-VIII-1911 (coll. Mus. Madrid)<sup>1</sup>.

Camp Jor (Wasserscheide zw. Perak und Pahang) A. Grubauer; Kelanton (East Malakka) (coll. Mus. Hamburg).

**Systella platyptera** De Haan (pl. IV, fig. 10).

- 1842. *Acridium (Trigonopteryx) platypterum* De Haan, *Verhand. Nat. Geschiedenis Ned. Overz. Bezitt.*, p. 151, Pl. XXIII, fig. 6.
- 1910. *Systella platyptera* Kirby, *Cat. Orth.*, III, p. 340, No. 5.
- 1928. *Acridium (Trigonopteryx) platypterum* Willemse, *Zoolog. Meded.* *Mus. Nat. Hist. Deel.*, xi, p. 8, fig. 10.

♂. General coloration green with brown.

Antennae reaching a little beyond the third sulcus of pronotum, not or indistinctly dilated basally, the basal part forming about a third part of its length, the last joint of it longer than broad; its coloration brown or brownish green, apical joint more bright or reddish-brown.

Head and pronotum brown or greenish brown or only the front brownish and the other parts greenish.

Elytra reaching far beyond the apex of hind femora, relatively narrow; anterior area distinctly narrowed from its middle to the apex, sinus ante-apicalis about as long as a third of the length of elytra, only slightly concave, nearly straight, apex less pointed, posterior angle broadly rounded; its coloration green with brown, irregular spots near the apex and along the posterior margin, the veins with regular dark points; in the middle with a brown oblique stripe, sometimes interrupted by hyaline spots, running from the middle of the anterior mar-

<sup>1</sup> Brunner von Wattenwyl: «Orthopteren des Malayischen Archipels». *Senck. Naturf. Gesells.*, Bd. xxiv, 1898, p. 196, enumerates *Trigonopteryx platyptera* De Haan, from Borneo (Baram river). I think rather that this specimen is *S. obliqua* Walker, resembling much *S. platyptera* which is not yet known to occur in Borneo.

gin to the posterior angle, but not reaching it, sometimes only with an indication of it.

Wings hyalinous or tinged with pale-green, veins brownish or green; with some irregular whitish spots in the middle. Pronotum relatively broad.

Anterior- and median legs brownish or greenish-brown, tibiae with yellowish spots.

Hind femora greenish-brown with dark points.

Hind tibiae greenish or brownish-green, with a dark spot in the basal third from above, apex more dark; spines with black tips.

Sternum and abdomen brown. ♀ unknown.

♂

Length of body.....	29-30 mm.
— of antennae.....	9-10 —
— of pronotum .....	7-8 —
— of elytra .....	30 —
Width of elytra .....	14-15 —
Length of hind femora.....	15 —

Locality: ♂ type (Mus. Leiden); Sumatra, ♂ (coll. Mus. Berlin); Sumatra, Kota Tjane (Mjöberg) (coll. Mus. Stockholm); Borneo, Kina Balu, 1,500 m. (Waterstradt) (coll. Mus. Hamburg).

#### **Systella bolivari nov. sp. (pl. IV, fig. 11).**

1928. *Systella* Willemse sp. nov., *Journal Mal. Branch Royal Asiatic Soc.*, vi, p. 6.

♂. General coloration green with yellowish brown.

Antennae slender, reaching the posterior margin of pronotum, not or scarcely dilated basally, the basal part forming about a fourth or third part of its length, the last joint of it longer than broad, indistinct; its coloration brown or greenish brown, apical joint yellowish brown.

Fastigium of vertex narrowed in front, with the sides straight or nearly so, the very apex more or less pointed.

Head and pronotum greenish brown; head and pronotum from above sometimes darker coloured.

Elytra reaching far behind the apex of hind femora, relatively less long and narrow, area anterior distinctly narrowed apically from its middle, sinus ante-apicalis about as long as a third of the length of elytra, straight or only slightly concave, the apex not pointed, posterior angle broadly rounded; its coloration green or brownish-green with few brown spots, especially along the posterior margin, dark points along the veins, and a narrow oblique brown stripe, from the middle of the anterior margin to the posterior angle but not reaching it, often incomplete and interrupted or only faintly indicated, sometimes besides this stripe with an irregular hyalinous spot.

Wings hyalinous, veins yellowish or greenish; pars anterior distinctly less broad than the pars posterior.

Anterior- and median legs greenish brown, tibiae with yellow spots.

Hind femora greenish brown with some brown spots along the keels, hind tibiae yellowish brown or green, darker apically. With a brown or black spot in the basal third from above.

Hind tarsi reddish brown. Sternum and abdomen greenish brown.

♀ unknown.

♂

Length of body .....	27-30	mm.
— of antennae.....	9-10	—
— of pronotum .....	7-7.5	—
— of elytra .....	25-28	—
Width of elytra .....	11-12	—
Length of hind femora.....	13-14	—

Locality: Siberut Isld. (H. Karny, 22-IX-1924), type (Mus. Leiden); Nias Isld., 1897-98, U. Raap (Mus. Genova); Goenoeng Sitoli, Nias (Mus. Madrid).

**Systella sarawakensis** nov. sp. (fig. 11; pl. IV, figs. 12, 13).

♂ ♀. General coloration reddish-brown, brown or greenish brown.

Antennae short, reaching a little beyond (♂) or reaching the middle of pronotum; in the ♂ scarcely, in the ♀ (fig. 11) slightly dilated basally, gradually narrowed towards the apex; the basal part in the

male extended to about a third part of antenna, in the female a little beyond the middle of antenna; its last joint in the male longer than broad, in the female broader than long; its coloration brown or yellowish brown, darker apically.

Fastigium of vertex obtusely angulate in front. Head and pronotum yellowish brown or reddish brown or blackish brown with the lateral facial keels blackish-brown.



L.

Fig. 11.—*Systella sarawakensis* nov. sp.  
Antenna ♀  
type.

Elytra reaching beyond the apex of hind femora, in the male with the anterior area relatively broad, narrowed apically, sinus ante-apicalis small, as long as about a fourth of the length of elytra, concave, apex rounded, posterior angle broadly rounded, in the female with the anterior area broad, slightly narrowed apically, sinus ante-apicalis small, as long as a fifth of the length of elytra, distinctly concave, apex more or less pointed, posterior angle broadly rounded; its coloration reddish brown, brown or greenish brown with dark points along the veins, with irregular, ill-limited dark spots and often with an indication of an oblique stripe in the middle or a dark spot in the middle of the anterior area.

Wings with the posterior margin relatively deep incised, hyalinous with some whitish dots, the veins brownish or yellowish, the very apex and the posterior margin in the female more intensely indicated.

Anterior and median legs blackish brown, brown or greenish brown with black spots.

Hind femora reddish brown, yellowish brown or greenish brown with some black points or spots.

Hind tibiae yellowish brown, often darker apically, with a black spot in the basal third from above. Hind tarsi reddish brown or yellowish brown.

Sternum and abdomen brown or yellowish brown.

	$\sigma$	$\Omega$
Length of body.....	24-25 mm.	32 mm.
— of antennae.....	8-9 —	8,5 —
— of pronotum .....	7 —	9,5 —
— of elytra.....	22-24 —	28 —
Width of elytra .....	9,5-10,5 —	13,5 —
Length of hind femora .....	13 —	16 —

Locality: Borneo, Sarawak Distr., ♂♂ and ♀, Mount Murad, 6.000 ft.; Mount Tibang, 1.400 m. (Mjöberg); type Mus. Stockholm.

**Systella rafflesii** Westwood (fig. 12; pl. V, fig. 14).

- 1841. *Systella rafflesii* Westwood, *Arcana Entom.*, I, p. 12, Pl. IV, figs. 1, 2.
- 1884. *Systella rafflesii* Bolivar, *An. Soc. Esp. Hist. Nat.*, XIII, pp. 52, 53, No. 3.
- 1905. *Systella rafflesii* Bolivar, *Bol. Soc. Esp. Hist. Nat.*, v, p. 303, No. 4; p. 304, No. 3.
- 1909. *Systella rafflesii* Bolivar, *Gen. Ins., Orth. Acrid. Pyrgom.*, p. 54, No. 4.
- 1914. *Systella rafflesii* Bolivar, *Journ. Straits Branch Royal As. Soc.*, No. 67, p. 87. (Larva).
- 1915. *Systella rafflesii* Bruner, *Univ. Studies Lincoln*, xv, No. 2, p. 60.
- 1925. *Systella rafflesii* Uvarov, *Trans. Entom. Soc. London*, p. 283, No. 53.
- 1930. *Systella rafflesii* Willemse, *Tijds. voor Entom. Deel*, LXXIII, p. 94, fig. 47.

♀. General coloration green or brown or green and brown.

Antennae short (fig. 12), reaching the middle of pronotum; strongly dilated basally, the basal part about as long as the apical one, the last joint of the basal part distinctly broader than long, its coloration brown or blackish brown, apical joint brighter coloured.

Head and pronotum brown, reddish brown or blackish brown or the sides of pronotum greenish-brown.

Fastigium of vertex angulately rounded in front.

Elytra very broad, anterior area only slightly narrowed apically, relatively broad, sinus ante-apicalis about as long as 2 seventh of the length of elytra, distinctly concave, apex more or less pointed, posterior angle broadly rounded; its coloration green, brownish green or reddish brown, with dark points along the veins, with or without irregular brown dots, sometimes dominating the green colour, and with or without a round brown spot in the middle of the anterior area and an indication of a brown oblique stripe in the middle of elytra. The brown spot is sometimes unicolorous, sometimes variegated with brighter parts.

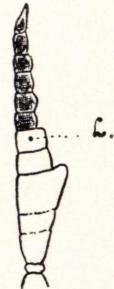


Fig. 12.—*Systella rafflesii* Westw. Antenna ♀.

Wings broad, hyalinous, veins yellowish brown or greenish.

Anterior and median legs brown, or blackish brown, tibiae with yellow spots.

Hind femora yellowish brown or reddish brown, with dark spots or stripes.

Hind tibiae brown or greenish, slightly darker apically with a black strip from above in the basal third. Spines with black tips.

Hind tarsi brown or yellowish brown.

Sternum and abdomen yellowish brown or brown.

♂ unknown.

♀

Length of body .....	36-40 mm.
— of antennae.....	7,5-9 —
— of pronotum .....	10-10,5 —
— of elytra.....	35-36 —
Width of elytra .....	19-20 —
Length of hind femora.....	19 —

Locality: 1 ♀ type, Sumatra ? (coll. Mus. London); Sumatra, Deli (Mus. Berlin); Soekaranda, Jan.-1894, Dohrn (Mus. Madrid); Sumatra, Exped. 1877-78 (Mus. Leiden); Malay Penin. Kedah Peak, 2.500-3.000 ft., 23-III-1928, (Raffles Mus. Singapore); Pahang, F. M. S., Kuala Jekun, 500 ft., in the jungle, XII-1921; H. M. Pendlebury, Perak, Batang Padang, Jor Camp., 1.800 ft., 26-II-1924; H. M. Pendlebury, Pahang, F. M. S., Sungai Kau, 15-VIII-1925; J. H. N. Evans (coll. Mus. London); Sumatra, Indragiri, Somgei Lalah, W. Burchard, leg. (coll. Mus. Hamburg).

### **Systella annandalei** Bolivar (fig. 13; pl. V, fig. 15).

1905. *Systella annandalei* Bolivar, *Bol. R. Soc. Esp. Hist. Nat.*, v, p. 303,  
No. 3; p. 305, No. 4.  
1909. *Systella annandalei* Bolivar, *Gen. Ins., Orth. Acrid. Pyrgom.*, p. 54,  
No. 3.  
1910. *Systella annandalei* Kirby, *Syn. Cat. Orth.*, III, p. 340, No. 8.

♀. General coloration brown, reddish-brown or green.

Antennae relatively long (fig. 13), reaching distinctly behind the middle of pronotum; slightly dilated basally and from the middle gradually, though fairly narrowed apically; the basal part reaching beyond

the middle of antenna, its last joint about as long as broad, its coloration brown, darker apically, apical joint sometimes brighter.

Fastigium of vertex angulately rounded in front.

Head and pronotum yellowish brown or reddish brown, the sides sometimes greenish-brown.

Elytra reaching far beyond the apex of hind femora; very broad, anterior area only slightly narrowed apically, broad, sinus ante-apicalis about as long as two seventh of the length of elytra, distinctly concave, apex pointed, posterior angle broadly rounded; its coloration green or reddish brown variegated with irregular brown spots, the veins with regular dark points, area anterior with a round brown spot in the middle, or a brown spot variegated with brighter parts and an indication of a brown oblique stripe in the middle of elytra, beginning near the round spot.

Wings hyaline, broad, veins yellowish or brownish; with some whitish dots in the middle of the wing.

Anterior and median legs brown or blackish brown or reddish brown with yellowish spots.

Hind femora greenish brown or brown with some dark spots in the middle of the area externo-media and along the keels.

Hind tibiae brown or greenish, slightly darker apically, with a black strip from above in the basal third.

Hind tarsi brown or yellowish brown, spines with black tips.

Sternum and abdomen yellowish brown, reddish brown or blackish brown.

♂ unknown.



Fig. 13.—*Systella annandalei* Bol. Antenna ♀ type.

♀

Length of body.....	39-42 mm.
— of antennae.....	10-11 —
— of pronotum .....	9.5-10 —
— of elytra.....	34-35 —
Width of elytra .....	19-20 —
Length of hind femora.....	18-19 —

Locality: Malaca, ♀ type (Mus. Madrid); Siam, Nakon Sri Tamarat, Khao Ram, 3.000 ft., 27-II-1922, H. M. Pendlebury; Siam, Nakon

Sri Tamarat, Khao Luang, 1.000-2.000 ft., 20-III-1922, H. M. Pendlebury (Mus. London).

**Systella borneensis** nov. sp. (fig. 14; pl. V, fig. 16).

♀. General coloration brown or greenish brown.

Antennae (fig. 14) reaching to the middle of pronotum, only slightly dilated basally, the basal part not reaching the middle of antenna, its last joint longer than broad; its coloration brown with minute black points, darker apically, nearly black, apical joint black.

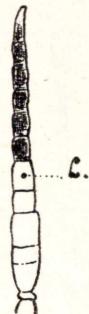


Fig. 14.—*Systella borneensis* nov. sp.  
Antenna ♀ type.

Fastigium of vertex angulately rounded in front.

Head and pronotum brown or yellowish brown.  
Pronotum relatively broad.

Elytra very broad, anterior area broad, only slightly narrowed apically, sinus ante-apicalis about as long as a fourth of the length of elytra, distinctly concave, apex not pointed, posterior angle angulately rounded; its coloration green with dispersed yellowish-brown stripes or spots, area anterior with a small round dark reddish brown spot in the middle near the radial vein and with or without a brown stripe in the area anterior.

Wings hyaline, broad, veins yellowish brown; with some whitish spots in the middle of the wing.

Anterior and median legs brown or blackish brown with yellow spots.

Hind legs absent.

Sternum and abdomen yellowish brown.

♂ unknown.

♀

Length of body.....	36 mm.
— of antenna.....	10 —
— of pronotum .....	10 —
— of elytra.....	34 —
Width of elytra .....	20 —
Length of hind femora.....	?

Locality: Mount Mulu (Borneo), coll. Everett, ♀ type (Mus. London); Kina Balu, Borneo, ± 1.500 m., Waterstradt, leg. (Mus. Hamburg).

**Systella dubia** nov. sp. (fig. 15; pl. V, fig. 17).

♀. General coloration brown or green and brown.

Antennae (fig. 15) reaching to the middle of pronotum, only slightly dilated basally, the basal part reaching as far as the middle of antenna, its last joint longer than broad or as long as broad; its coloration brown with minute black points, the apical half blackish brown.

Head and pronotum greenish brown, from above brown, pronotum relatively narrow.

Elytra reaching beyond the apex of hind femora, broad; anterior area only slightly narrowed apically, sinus ante-apicalis about as long as a fourth of the length of elytra, distinctly concave, though less than in *boreensis*, apex not pointed, posterior angle broadly rounded; its coloration green with only a few brown points along the sinus ante-apicalis and the posterior margin, veins with dark points, and a small round reddish-brown spot in the middle of anterior area and a little dark point there beneath, just opposite the radial vein. In the basal half near the posterior margin also with a dark point.

Wings hyalinous, broad, veins yellowish-green; with a few whitish spots in the middle of the wing.

Anterior and median legs brown with yellow spots.

Hind femora yellowish-green with some dark points.

Hind tibiae yellowish green, darker apically, with a dark spot from above in the basal third, spines with black tips.

Hind tarsi yellowish brown.

Sternum and abdomen yellowish brown.

♂ unknown.

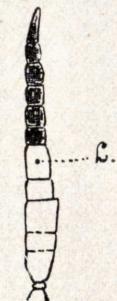


Fig. 15.—*Systella dubia*  
nov. sp. Antenna ♀ type.

	♀
Length of body.....	.37 mm.
— of antennae.....	9 —
— of pronotum.....	10 —
— of elytra.....	34 —
Width of elytra.....	19 —
Length of hind femora.....	.18 —

Locality: Borneo Occ., Pontianak, 1901, ♀ type (Mus. Madrid);

\*

Matang, Mount Sarawak, 9-V-1910, I ♀, differing in the shape of the antenna, being shorter (8 mm.) and not at all dilated basally (Mus. Madrid).

#### List of the described species.

*Systella philippensis* Walker. Philippines.

- *dusmeti* Bolivar. Borneo.
- *gestroi* Bolivar. Sumatra, Engano.
- *obliqua* Walker. Sumatra, Malay Peninsula, Malaca, Siam.
- *platyptera* De Haan. Sumatra, Borneo.
- *bolivari* nov. sp. Isl. Nias, Isl. Siberut.
- *sarawakensis* nov. sp. Borneo.
- *rafflesii* Westwood. Malay Peninsula.
- *annandalei* Bolivar. Malaca, Siam.
- *borneensis* nov. sp. Borneo.
- *dubia* nov. sp. Borneo.

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### Explanation of plates III-V.

#### PLATE III.

Fig. 1.—*Systella rafflesii* Westw. Nymph (*Gyrtona compressa* Stål). From a specimen from Camp Jor, Malaca (Mus. Hamburg).

Fig. 2.—*Systella philippensis* Walk. ♂. Cotype of *S. westwoodi* Stål. (Mus. Stockholm).

Fig. 3.—*Systella philippensis* Walk. ♂. Type of *S. siccifolia* Bol. (Mus. Hamburg).

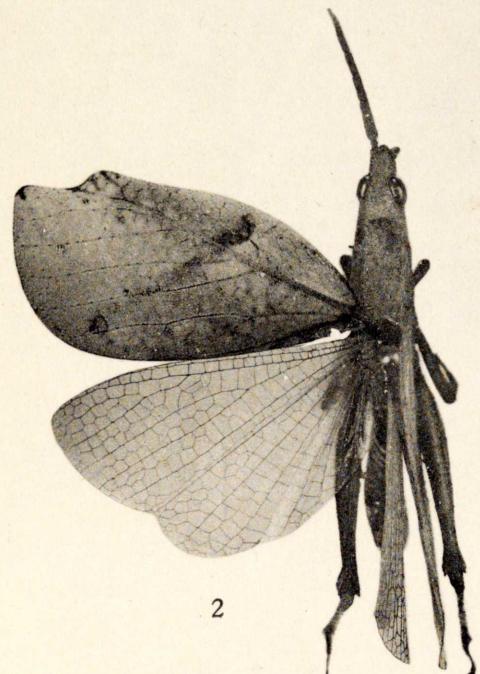
Fig. 4.—*Systella philippensis* Walk. ♀. Surigao, Mindanao (Mus. Stockholm).  
 Fig. 5.—*Systella dusmeti* Bol. ♂. Type, Kina Balu (Mus. Madrid).  
 Fig. 6.—*Systella obliqua* Walk. ♂ compared with type by B. P. Uvarov.

## PLATE IV.

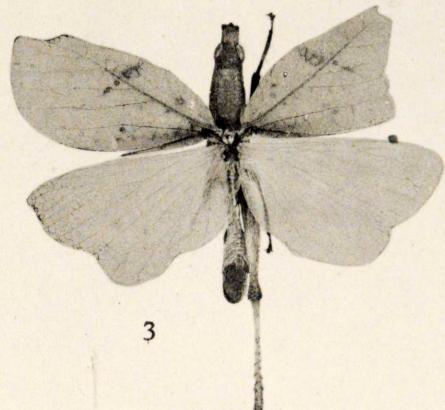
Fig. 7.—*Systella dusmeti* Bol. ♀. Type, Kina Balu (Mus. Madrid).  
 Fig. 8.—*Systella gestroi* Bol. ♂. Type, Engano (Mus. Madrid).  
 Fig. 9.—*Systella gestroi* Bol. ♀. Type, Engano (Mus. Madrid).  
 Fig. 10.—*Systella platyptera* de Haan. ♂. Type. (Mus. Leiden).  
 Fig. 11.—*Systella bolivari* nov. sp. ♂. Siberut Isl. (Mus. Leiden).  
 Fig. 12.—*Systella sarawakensis* nov. sp. ♂. Sarawak (Mus. Stockholm).  
 Fig. 13.—*Systella sarawakensis* nov. sp. ♀. Sarawak (Mus. Stockholm).

## PLATE V.

Fig. 14.—*Systella rafflesii* Westw. ♀ compared with type.  
 Fig. 15.—*Systella annandalei* Bol. ♀. Type, Malaca (Mus. Madrid).  
 Fig. 16.—*Systella borneensis* nov. sp. ♀. Type, Borneo (Mus. London).  
 Fig. 17.—*Systella dubia* nov. sp. ♀. Type, Pontianak (Mus. Madrid).



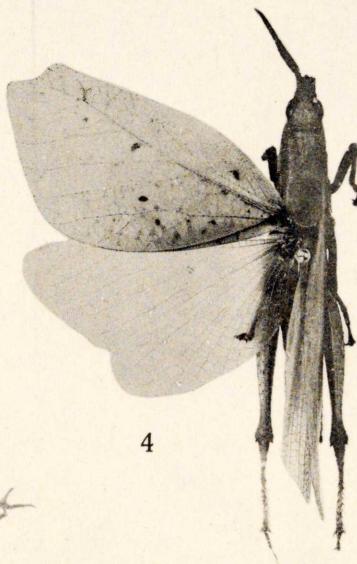
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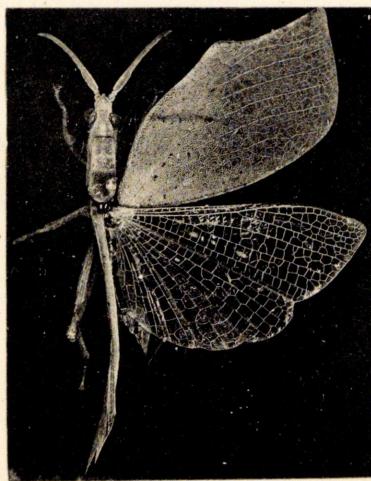
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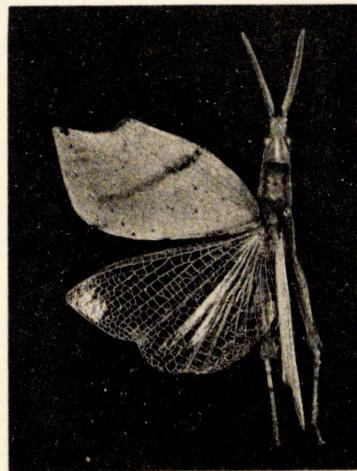
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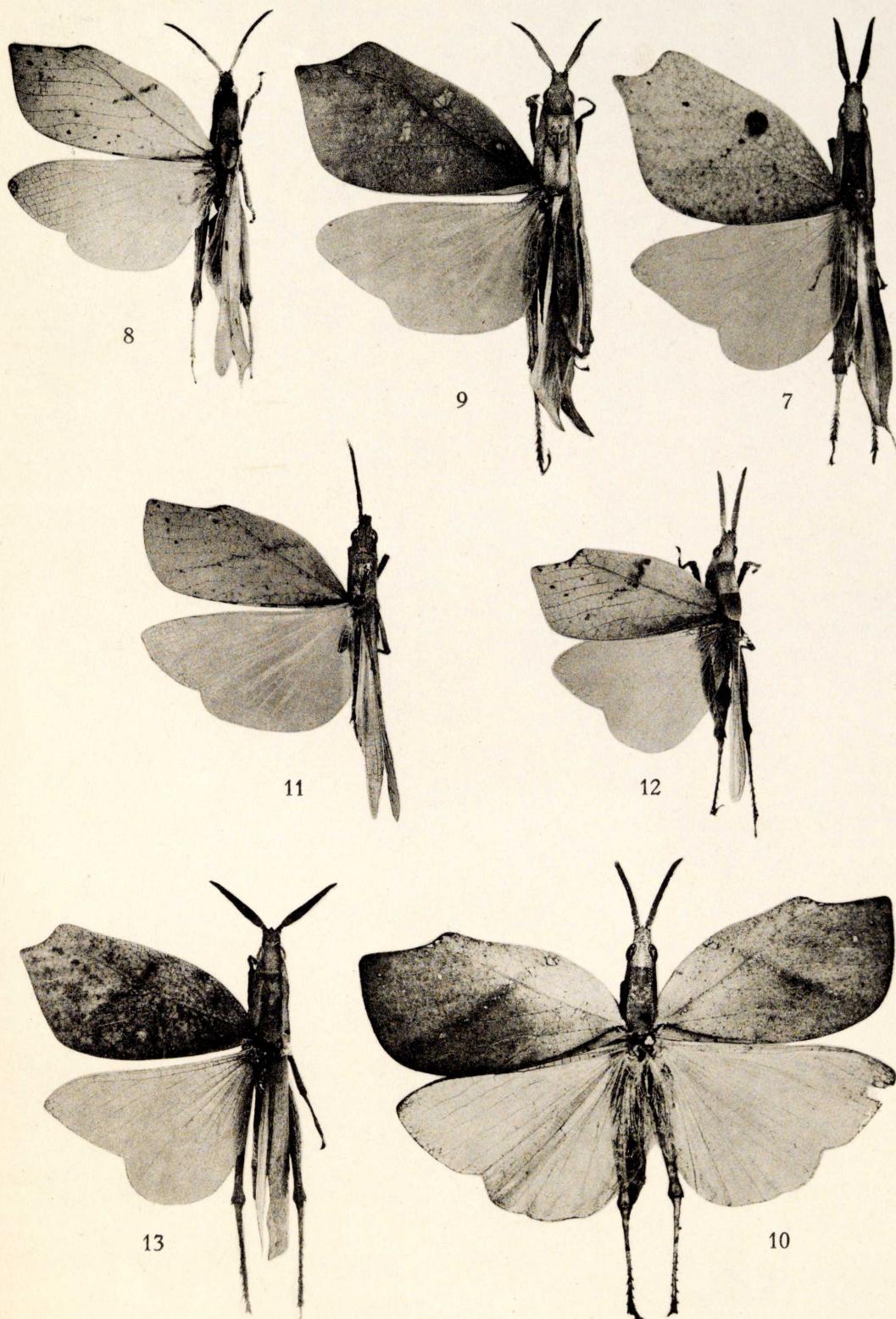
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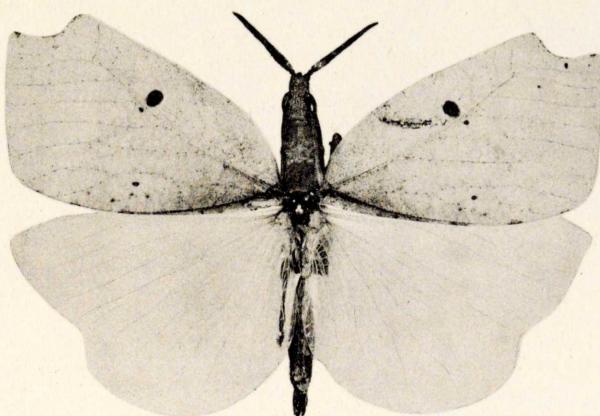
C. Willemse: Preliminary Revision of the genus *Systella* Westw.



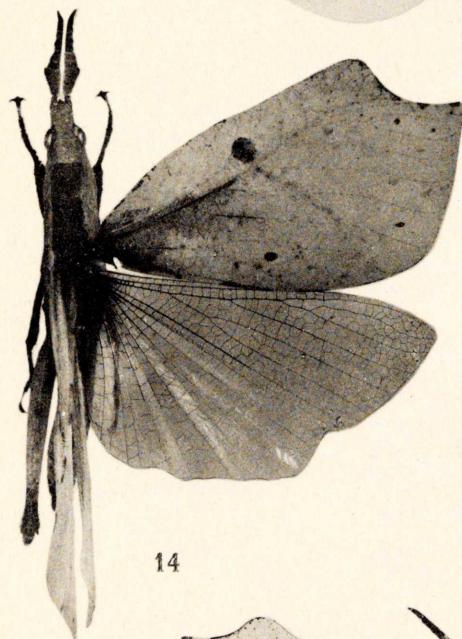


C. Willemse: Preliminary Revision of the genus *Systella* Westw.

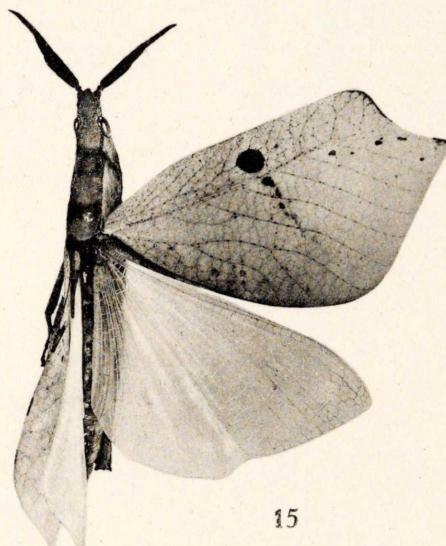




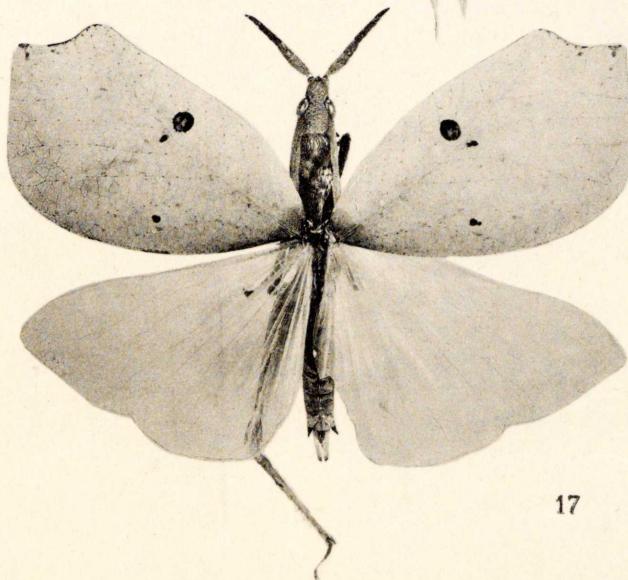
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C. Willemse: Preliminary Revision of the genus *Systella* Westw.

